STEARNS & WHELER
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# TECHNICAL MEMORANDUM

**To:** Jane Crowley, Eastham Health Agent

**From:** Nathan C. Weeks, P.E.
J.Jeff Gregg, P.E
Jessica Paddock

**Date:** February 23 ,2009

**Re:** Town of Eastham
Draft Interim Needs Assessment and Alternatives Screening Analysis Report
Town Comments and Proposed Discussion to Address the Comments

**Job No.** 61204

This memo is written to address comments received from Town staff and Wastewater Committee members on the Draft Interim Needs Assessment and Alternatives Screening Analysis Report.

The written comments are attached at the end of this memo and are discussed in the memo. Excerpts from the comment letters are provided in standard type and then addressed with numbered responses (A.1, A.2 etc.) in ***bold italics***.

## A. COMMENTS FROM MEINT OLTHOF DATED JANUARY 30, 2009.

A.1 We need to concentrate on developing reasonable alternatives for the affected areas and develop rough capital and operating cost estimates for these. How much money is left in the S&W budget to do this?

***These items will be developed in the "Plan Evaluation Report" and there is sufficient budget for this work.***

A.2 Rock Harbor:

Since 80% removal is required no tweaking of existing septic tanks. The two options are either to Roach property or Tri County. Can we break down capital costs in three sections:

1. Collection to pump station
2. Pump station and pipe to treatment plant
3. Treatment plant

***Yes, capital and O&M costs will be developed for these items.***

The Tri County option for this area, if considered alone, is the way to go. No capital at treatment plant; just pay the fee charged by Orleans. Get the Orleans report and use the O&M costs from that and add a percentage to help them pay off the capital for the portion set aside for us.

***This is one of the ways to share costs. Capital costs are often shared to reserve capacity at the WWTF.***

Is there a lot we can buy in this area to consider a cluster system?

***We have identified a few potential sites, and the Roach Site appears to be the best.***

A.3 Town Cove/ Nauset Marsh:

- 55% removal required.
- Upgrading all septic tanks to I/A is theoretically possible but impractical.

***Yes, upgrading all septic systems is impractical and the performance may not be good enough. We will provide more evaluations in the Plan Evaluation Report.***

Collect and pump to:

1. Roach Property
2. Tri County

There has to be a difference in capital cost between these two options.
Assume we do the same as Orleans; collect only about 60% of the homes.

***We will provide further detailed costs based on available sites. The typical cost of $50,000/property was an order -of-magnitude typical cost.***

A.4 Welffleet Harbor Area:

This is an area that will be affected at some point in time. Assume for now we need to remove 35%.
So collect 50% and send to Roach Property or Tri County

***We believe there is not sufficient basis to make an estimate at this time.***

A.5 Town Wide system:

Need a capital cost to install a system to treat 100% of wastewater generated in Eastham at Roach Property or at Tri County. This is to compare with the town wide water supply.

***This cost is currently estimated at $300,000,000 based on the typical cost of $50,000/property and approximately 6,000 existing properties. A full town-wide system is not needed (based on the current assessment of human-health and environmental-health wastewater needs) and probably should not be calculated in more detail. We will provide this cost in the Plan Evaluation Report to provide the comparison with the town-wide water supply system cost.***

The Orleans approach to treat only 50% is no good for this since if the idea is to remove wastewater to improve drinking water quality over time we need to treat 100% since nitrate problems are throughout the entire town of Eastham.

***We do not believe that a town-wide wastewater system by itself would be sufficient to improve private drinking water quality over time. There are other pollutant sources to the private drinking water supplies that require a public drinking water supply (from a protected source) to meet the public-health wastewater needs.***

A.6 Pond Area:

Ed Eichner is promoting to treat only the septic systems within the 300 ft buffer zone; S&W treats 100% of the septic systems in the entire water shed. Who is right?

***The answer depends on your understanding of how far the phosphorus travels. If Ed Eichner is truly promoting treating the wastewater within the 300-foot buffer zone, he must believe that phosphorus beyond the 300-foot buffer zone is not moving towards the ponds. This belief would be contrary to the current science of how phosphorus plumes from septic-system sources move in the soil. The Commission's targeting of the 300-foot buffer area appears to be based on State of Maine regulatory considerations that are not completely based on the latest science.***

Need to include the systems removing phosphorus from septic tanks; this is an option for those systems in the buffer zone. But is it enough?

***There are no systems that are currently approved by MassDEP for this purpose. The expected performance of the few experimental systems designed for phosphorus removal is unknown. Any system would still provide some phosphorus loading which would move to the ponds. We will provide discussion on this topic in the Final Interim Needs Assessment and Alternatives Screening Analysis Report.***

To treat all homes in the drainage area of the ponds will require collection/ transfer and treatment at the Roach Property or Tri Town.

***Yes; this is described in Freshwater Pond System Plans 1 and 2.***

What is cost to treat ponds for phosphorus and how effective is that; how many times do you have to do it in 30 years?

***An alum treatment cost for Eastham's ponds (based on the alum treatment costs recently estimated for Lovers Lake and Stillwater Pond in Chatham) would be $900,000. The water quality in Hamblin Pond in Barnstable is still very good following an alum treatment completed 14 years ago. Barnstable's Conservation Director originally thought that the treatment would be good for 10 years and is now hoping it will be good for 20 years. This information will be developed and presented in the Plan Evaluation Report.***

There is a big difference in opinion between Ed Eichner and S&W on what percent of the phosphorus into the pond is coming from septic tanks. We can argue about that for a long time but what other tools can the town implement to reduce input of phosphorus that require capital?

***We will provide information on the other tools that the Town can use in the Plan Evaluation Report.***

A.7 Roach Property:

- This seems to be the only site available right now. Schools will be a problem.
- Is this property located in an area that demands N and P removal or only organics removal?
- Need infiltration so assume an MBR system for treatment.

***The Roach property is located in the Wellfleet Harbor watershed which may have a nitrogen limit developed in the next few years. It is not an ideal site. MBR treatment technology is expensive and is usually only used for very small sites or for the desire to reuse the treated water. We will tend to develop costs for a lower cost technology (that has good performance) such as a sequencing batch reactor (SBR).***

Does the effluent discharge to an area that drains to the potential drinking water wells?

Make layout of a Eastham WWTP at the Roach property for

1. The entire town-100%
2. Rock Harbor/ Cove/Nauset marsh/Wellfleet Harbor/ ponds

If Roach property infiltration ends up in our potential drinking water well site we have a problem (either real or imagined). Then Tri County is our only option.

***The Roach property is not located in a watershed to a future public drinking water well; therefore, a future threat to public water supplies is not a concern. We plan to develop costs for a treatment plant at the Roach property to handle wastewater from the Rock Harbor, Town Cove/Nauset Estuary, and Freshwater Pond Watersheds in the Plan Evaluation Report. We do not plan to develop costs (beyond the typical costs of $300,000,000 discussed earlier) for a treatment system to serve all of Eastham because the needs do not justify it. The wastewater needs for Wellfleet Harbor are not yet known.***

A.8 Tri County:

- Need to project the increase in size for the Tri County plant if we treat there:

  1. The entire town-100%
  2. Rock Harbor/ Cove/Nauset marsh/Wellfleet Harbor/ ponds

- The capital costs can be projected by using C1/C2=(Q1/Q2)^0.6
- What are the projected O&M costs at Tri County?
- What is cost of getting wastewater there?

***The cost for wastewater systems to recharge the flows from the Rock Harbor, Town Cove/Nauset Estuary, and Freshwater Pond areas at the proposed Orleans WWTF will be estimated. Again, treatment of 100% of Eastham's flows is not warranted.***

A.9 What is impact on design of our own system of the large difference between summer and winter load?

***The impact is typically measured as a peaking factor that is the ratio between the average-annual flows and the maximum-day flows. The Chatham CWMP project estimated a 1.8 peaking factor for these time periods based on water consumption. The Plan Evaluation Report will evaluate and state the assumed maximum-day peaking factors. It is noted that some wastewater management components are sized based on maximum-month flows while others are sized based on maximum-day or peak-hour flows. These are important design considerations.***

A.10 There is not much available undeveloped land in town but is the Roach Property the only one? And if it is, so be it; for this phase of the project that is OK.

***There are not many other sites and it would be difficult to site several community/cluster treatment plants. Town staff reviewed our site identification procedures and indicated a few additional vacant Town sites, but most have conservation restrictions or are unsuitable/wet sites.***

A.11 The report has a long list of treatment options. I am not sure what we do with that though. For now lets concentrate on proven technology and cost that out. If/When we do a comprehensive plan that can be used again.

***Yes.***

A.12 In our last meeting we authorized S&W to prepare a newsletter; I think we should ask them to get us an outline so we agree on the contents.

***We plan to provide a draft of the newsletter in the future. We recently received some excelent Town photographs that will be used in the newsletter.***

## B. COMMENTS FROM SANDY BAYNE DATED JANUARY 2009.

B.1 I may have missed discussion in the section on fed regulations, but given all our primary drinking water well sites, but not wastewater treatment potential sites, are adjacent to the CCNS, does the National Policy Act of 1970 apply to us? Does the fact that we are not expected to enter into the NEPA process exempt us from any implications? Why?

***The Town may need to enter the NEPA review process if a town facility (water or wastewater) is proposed on (or possible adjacent to) the CCNS. At this point in the planning process, we would not expect to enter the NEPA process for the potential treatment sites identified.***

B.2 How did Great Pond get on the category 5 Integrated Waters list? When was it tested and by whom?

(Certainly the pond report bears that out, but why not Herring, etc.?)

***We do not know. Possibly a call to the State or to Ed Eichner could provide clarification.***

B.3 Did the CCC set the 5 ppm N limit for CC rather than the state limit of 10 ppm for a specific reason? Just caution because of the sole source aquifer? The pervious soils? (*)

***We believe that they set it at 5 ppm as a planning tool with the approach that if you plan for 5 you have a sufficient safety factor before you reach 10.***

B.4 Figure 4-1: an important map for all of us to be familiar with. Can you arrange this to see the ponds more clearly, especially those which contribute to Nauset watershed: Moll's, Minister, Muddy (what we locals call Mill) and even part of Depot? Can that be written somewhere in the text?

***Yes, this will be added to the text. More information will be developed on this issue in the Nauset Estuary Technical Report being prepared by the MEP.***

B.5 Pg. 4-2: difference between "marine" and "ocean"?

***They are all marine-water recharge areas and the two groups will be combined.***

B.6 4-6, 7: We refer to Mill Pond as Muddy in our studies, so although I know some maps show it as Mill, could you call it Muddy? To avoid confusion at least among the pond sampling group?

***To avoid confusion, we will refer to this pond as "Mill/Muddy" Pond.***

B.7 We have sampled Moll's, Widow Harding and Jemima for 7 years; we have restarted Bridge and have finished 3 years of that work; and we do not sample Deborah's or Baker's. However, we are sampling Higgins and Little Depot. I suspect Higgins, mudhole that it is, may contribute to the Nauset estuary.

***Ed Eichner may have some insight on this issue.***

B.8 Pg. 4-15: discussion of zoning districts leaves out all important District H. Important for public to know how protected it is.

***We will add a discussion.***

B.9 Section 7-2: re R. osmosis: you mention under bottled water delivery option as a disadvantage lack of fire protection, but that is true here too, and since R.O.has been suggested as a solution at TM to our water problems, as Nate knows, could we put it here too?

***Yes, we will add it here too.***

B.10 Pg. 7-9: re 2-3 year cycle of pumping: Our county health department staff has told us that pumping every 3 years for a well sized and functioning system is probably unnecessary, and of course removes little N, but even further that thorough pumping can remove too much bacteria, harming the system's function. Is 2-3 years the final word?

***We don't think that there will be a final word on this issue. The main consideration with septic tanks is that they need to be pumped periodically to prevent the solids accumulating to a level where they can flow to the leaching facilities and plug the soils around the leaching facilities. (Plugged soils will cause the septic tank effluent to come to the ground surface and cause a health threat.) A pumping frequency of every 2 to 3 years should be frequent enough to prevent that occurrence.***

B.11 7-11: tight tanks are a TM issue (*); some who have them would see transport of pumped effluent as okay because they are used in Eastham in sensitive areas, such as abutting ponds, and the transport could presumably be to less sensitive or GW discharge permitted sites.

***Town residents need to understand that tight tanks are not considered a long-term solution by MassDEP and by Town Health Department.***

B.12 7-12: Can you explain the seasonal issues with composting toilets? (*) How expensive and how difficult to retrofit?

***Composting toilets need to be maintained (mixed, aerated, etc.) to be viable biological processes. If they are left unattended for many months, they will not be viable if they receive a sudden (shock) load from a sudden influx of people. If they are not a viable biological process, they will not compost properly. The retrofit cost and difficulty depends on each individual bathroom. We do not believe they are a viable long-term solution; therefore, we have not presented costs on this technology.***

B.13 Table 11-2: An important table, but hard to understand even though I'm familiar with most of the material. Can it be rearranged somehow? (Sorry, I can't even suggest how!)

***We will present it in a clearer fashion.***

B.14 Some of Meint's list of questions from TM have been answered very directly; others may have been answered indirectly, but could we spell the answers out more specifically? Your lists of selected readings are very good; unfortunately I haven't had time to review them yet.

***We will provide this memorandum in the Final Interim Needs Assessment and Alternatives Screening Analysis Report to spell out the answers specifically. If additional questions arise, or if you have an additional list of TM questions, we will address them in the Plan Evaluation Report.***

## C. COMMENTS FROM JANE CROWLEY DATED FEBRUARY 3, 2009

C.1 General: Your team did a nice job organizing the needs into two easily understandable areas. The executive summary is detailed enough to relay the content of the report including the information gained from nitrate testing of wells. The expanded text lacks this info. The format and content are good but I would like more Eastham specific reference where possible. For example the GIS mapping and I/A update work done by Susan Rask, BCDHE, would very descriptive of present day conditions to include but in the end will not change the analysis. The reason I consider this imperative is to show the direction the Town is taking in the absence of a more strategic approach. The onsite I/A Table ES-1 could be expanded to show what currently exists in Eastham or an additional table could be included later in the report.

***We will add more text on these subjects.***

C.2 I would suggest options for further consideration to include priorities as discussed. This tool would lead to clear wastewater decision making possibilities that logically work in concert with water supply options. Its a lot to ask or expect and maybe not realistic. Just thoughts to consider.

***We will add text on "Potential Prioritization" in the last chapter and in the Executive Summary. Plan Evaluation Report will provide recommendations on priorities that we think the Town should consider.***

Specific comments by section for volume #1:

- 1-2 paragraph(p) 3 ...plans to extend municipal water supply to all properties in Town are being considered.
- 3-3 p 2 Year 5 NPDES permit complete
- 4-4 and 4-5 why differ conc for fertilizer (5 vs 6)
- 4-15 good point. I will have field added to our database for future reference
- 4-16 B p2 I/A systems in Eastham 131 permitted 91 installed. There are maps that join density and water testing info (BCDHE) that might show why and where systems are located or may be located under current BOH regulation. We also have maps that given current regulatory review show potential location of I/A systems. What do you think? Too much information??
- 4-18 end of "other land use " ... for example leaves you hanging. Where was this going?
- 4-19 p1 Town Assessor not Town Planner provided info
- 5-2 New map of last 3 years of testing from 7/1/2005 to 6/30/2008 is available (FY 05 to FY08) same as figure 4-5
- 5-3and 5-5 No action alternative this is where I think more detailed explanation as in executive summary may be good...effect of unmetabolized drugs and unknown combined contaminant effect etc.
- 6-2 I/A section I suggest more specific Eastham info
- 7-1 p1 used to mitigate public health and environmental impact from wastewater
- 11-1 refers to well sites on table 11-1 where 5 sites are shown not figure 4-2 not 4
- 12-1 p1 any "credit" for sites like Brackett Landing (8000 gpd design flow) with cluster Sepitech-Nitrex with 10 mg/l limit. Is this a potential option in 55% reduction area for town to

include? Point is valid at present this system is receiving very little flow so system is still not be tested.

- 12-2 should the point be made that the nitrogen load remains the same even if the volume is reduced?
- 12-4 how about adding public education regarding "proper elimination" of unused medicine/medial waste
- 13-5 Does the topo and hydrology related to GW discharge lend itself to this in Eastham?
- 14-7 p2 may want to include exploring regional issues with Wellfleet in
- the future
- 14-7 p4 how about septi-tech/nitrex option
- 14-16 p3 Should we include the cluster treatment option capable of removing nitrate-nitrogen to 10 mg/l

Specific comments by section for volume #2:

- figure 4-4 more current info available I will fax the info or if you want it we can copy for you
- figure 4-5 more current info available 7/1/2005 to 6/30/2008 is available (FY 05 to FY08) if you want it we can copy for you, again let me know
- figure 8-7 repeat figure?
- table 14-1 would like to see this more defined and supported by areas of highest priority in each category. Is that possible at this time? This relates to concept Jeff proposed at our meeting.
- table 14-2 can we give ballpark costs and include yearly average cost of private well use added to cost for reverse osmosis, also missing capital costs for bioclere ( O&M), advantex
- table 14-4 any way to integrate Eastham installed I/A's?

Table 14-5 water: can we give current day est. cost? Wastewater: est cost per household? Any examples of such facilities on the cape for reference?

***We have reviewed and discussed these observations/comments items and will make changes to the text.***

Questions:
I could use additional explanation of Table 14-3 related to conversion from kg/d to mg/l limits. (I am mostly familiar with the mg/l concentration)

***The connection between mg/L and kg/d is the amount of flow that is involved. We will provide a footnote and explanation.***

**Comments S&W report**
**Meint Olthof**
**January 30, 2009**

We need to concentrate on developing reasonable alternatives for the affected areas and develop rough capital and operating cost estimates for these. How much money is left in the S&W budget to do this?

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Since 80% removal is required no tweaking of existing septic tanks. The two options are either to Roach property or Tri County
Can we break down capital costs in three sections:

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Assume we do the same as Orleans; collect only about 60% of the homes.

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The capital costs can be projected by using $C1/C2=(Q1/Q2)^{0.6}$
What are the projected O&M costs at Tri County?
What is cost of getting wastewater there?

**Question**
What is impact on design of our own system of the large difference between summer and winter load?

**Other potential sites**:
There is not much available undeveloped land in town but is the Roach Property the only one?

And if it is, so be it; for this phase of the project that is OK.

**General comment**:
The report has a long list of treatment options. I am not sure what we do with that though. For now lets concentrate on proven technology and cost that out. If/When we do a comprehensive plan that can be used again.

**Education of Town**:
In our last meeting we authorized S&W to prepare a newsletter; I think we should ask them to get us an outline so we agree on the contents.

**Comments on Draft Interim Needs Assessment and Alternatives Screening Report**

Stearns and Wheler, Jan. 2009
Sandy Bayne

Thanks to Nate, Jeff and Jessica for attending a meeting with us.

My comments are largely, as usual, as a lay reader, hoping for clarity both for myself and for the public.

I have also looked for the answers to the questions asked at TM. re wastewater as it relates to water supply; these were presented to S&W at a meeting in Oct. 2008. Issues raised at TM are asterisked; some may not be on Meint's list.)

This seems to me to be a thorough review of the situation, both as regards Eastham and as regards the current state of the wastewater treatment world at all levels of government.
I appreciate very much the big picture afforded by the Introduction, and I'm grateful for the glossary.

I may have missed discussion in the section on fed regs, but given all our primary drinking water well sites, but not ww treatment potential sites, are adjacent to the CCNS, does the National Policy Act of 1970 apply to us? Does the fact that we are not expected to enter into the NEPA process exempt us from any implications? Why?

How did Great Pond get on the category 5 Integrated Waters list? When was it tested and by whom? (Certainly the pond report bears that out, but why not Herring, etc.?)

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Some of Meint's list of questions from TM have been answered very directly; others may have been answered indirectly, but could we spell the answers out more specifically? Your lists of selected readings are very good; unfortunately I haven't had time to review them yet.

**What S&W needs from us:**

Re our next steps:
The Assessor's office has not yet had time at this busy time of year to do the checking of the build out map; Gail says she may be able to do it next week.

Re treatment facility sites: I agree with your ranking.

Roach sounds like a no-brainer to me.

Senior Center has closely abutting homes, but the parking lot is fairly large.

The elementary school has a very limited property which is already challenged (Probably they should be on municipal water too.) If they were, perhaps a treatment facility could go there. Although the watershed WT contours would indicate any discharge would move away from the pond right behind it, I think that might conceptually be a hard sell, not to mention the possible perception there , in addition to the day care center, re kids...maybe we need another column called community concerns. Why did all our human care facilities end up on the crest of the watershed near Schoolhouse and Nauset Rds.? Are there CCNS issues with these last 3 sites as well?

Having had convos with several people who are quite interested in our plans but who want to see us moving forward on alternates which also cure the problem ("show you're serious about clean water...start a fertilizer education program", "work on stormwater runoff" etc.), and who attend TM, I think we might move forward on a newsletter which tells voters we are working on ww but are considering the other ways to keep down the level of P in the ponds and N in the estuaries. That given the cost of ww treatment, we recognize we need to employ multiple types of mitigation. ETC.
I'd like to circulate that by early April.

To: Nate Weeks

From: Jane Crowley

Date: February 3, 2009

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11-1 refers to well sites on table 11-1 where 5 sites are shown not figure 4-2 not 4
12-1 p1 any "credit" for sites like Brackett Landing (8000 gpd design flow) with cluster

Sepitech-Nitrex with 10 mg/l limit. Is this a potential option in 55% reduction area for town to include? Point is valid at present this system is receiving very little flow so system is still not be tested.
12-2 should the point be made that the nitrogen load remains the same even if the volume is reduced?
12-4 how about adding public education regarding "proper elimination" of unused medicine/medial waste
13-5 Does the topo and hydrology related to GW discharge lend itself to this in Eastham?
14-7 p2 may want to include exploring regional issues with Wellfleet in the future
14-7 p4 how about septi-tech/nitrex option
14-16 p3 Should we include the cluster treatment option capable of removing nitrate-nitrogen to 10 mg/l

Specific comments by section for volume #2:
figure 4-4 more current info available I will fax the info or if you want it we can copy for you
figure 4-5 more current info available 7/1/2005 to 6/30/2008 is available (FY 05 to FY08) if you want it we can copy for you, again let me know
figure 8-7 repeat figure?
table 14-1 would like to see this more defined and supported by areas of highest priority in each category. Is that possible at this time? This relates to concept Jeff proposed at our meeting.
table 14-2 can we give ballpark costs and include yearly average cost of private well use added to cost for reverse osmosis,also missing capital costs for bioclere ( O&M), advantex
table 14-4 any way to integrate Eastham installed I/A's?
Table 14-5 water: can we give current day est. cost? Wastewater: est cost per household? Any examples of such facilities on the cape for reference?

Questions:
I could use additional explanation of Table 14-3 related to conversion from kg/d to mg/l limits. (I am mostly familiar with the mg/l concentration)

Let me know if you need any additional data. Hope my comments are coherent. Call if you need me to explain further(508)240-5907 ext. 229. I will fax some materials to you today for your consideration.

Thanks again. It feels good to get started in the right direction.

(2)